

Palm-Thumb Grasp

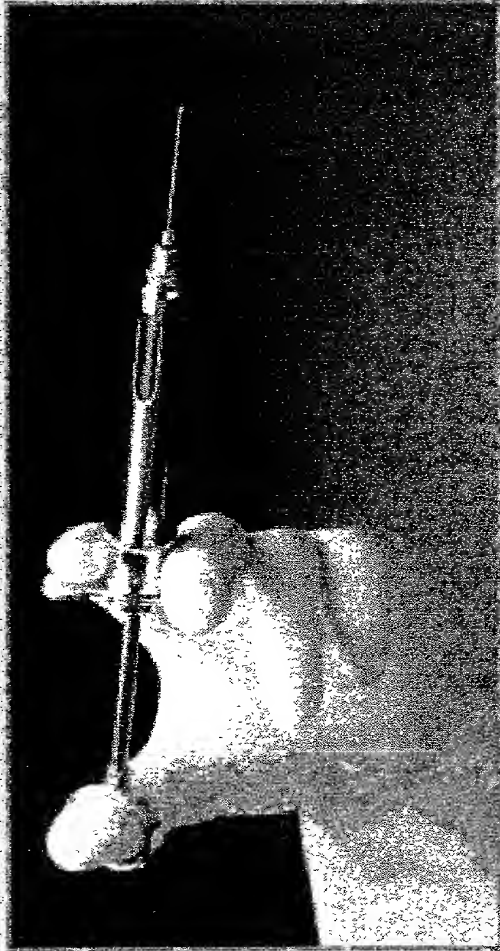


FIG. 1A
PALM THUMB

Pen Grasp



FIG. 1B
PEN GRASP

Figure 3

Insertion Techniques

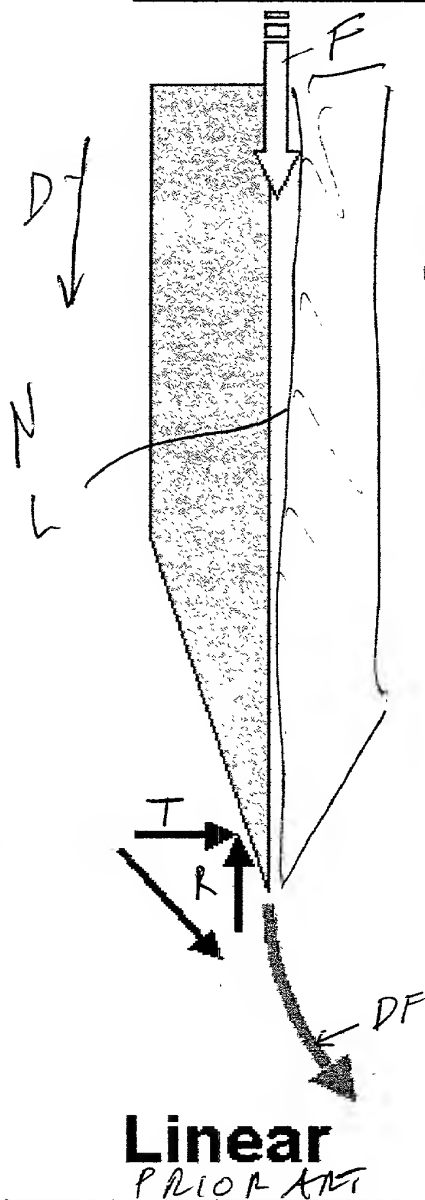


FIG. 2 A

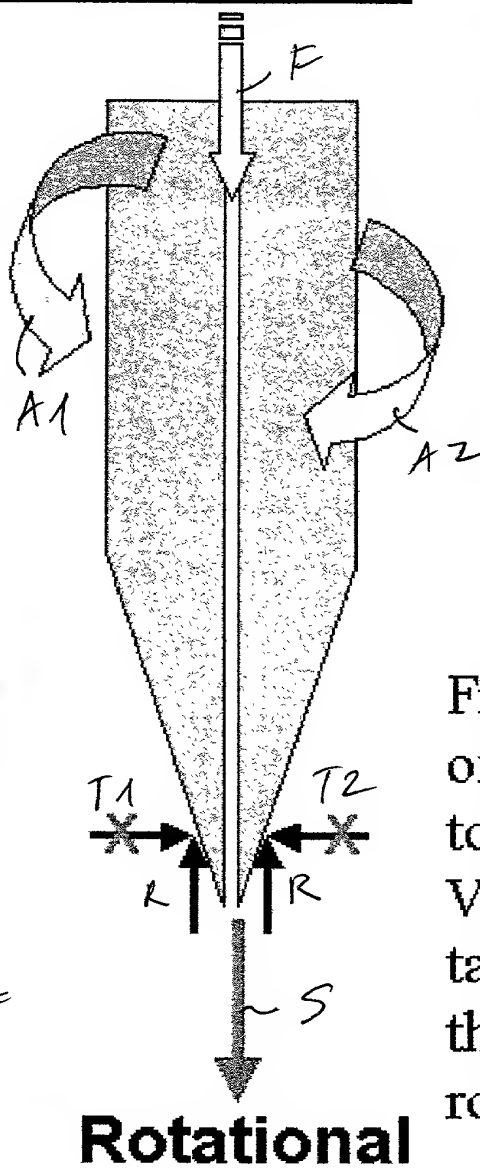


FIG. 2 B

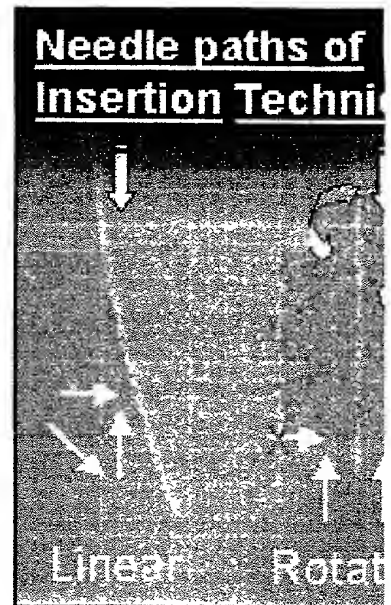


Figure 4 simplistic illustration of the vector force system to the beveled end of the needle. Vector analysis illustrates the forces taken during needle insertion in the Linear and the Bi-rotational insertion techniques.

Rotational Insertion

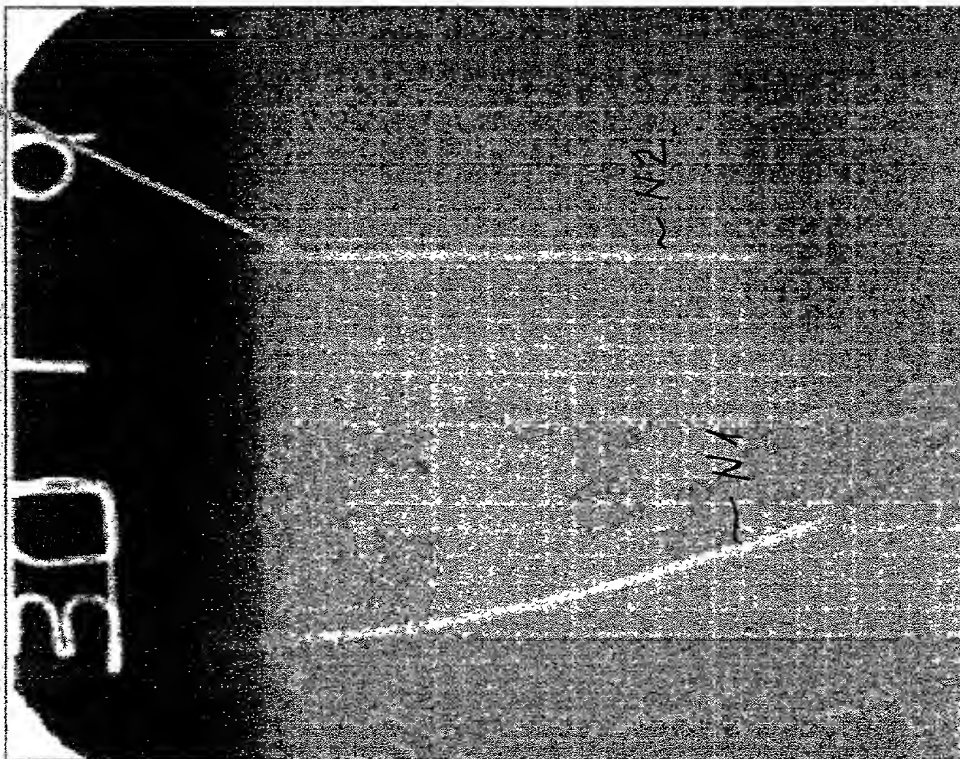


Fig. 3A

Linear Insertion

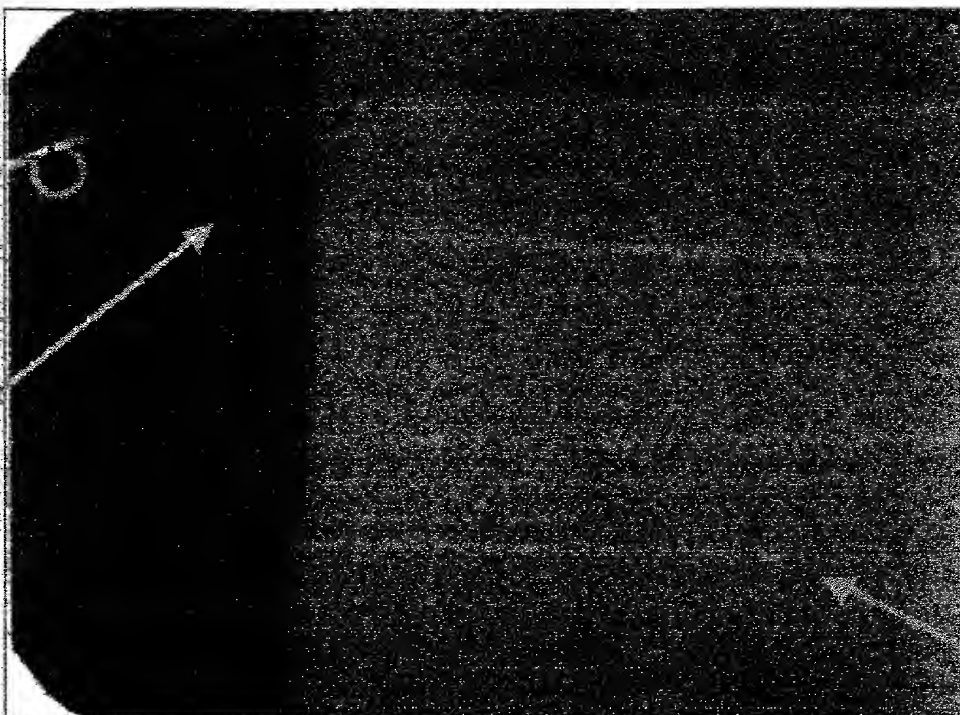


Fig. 3B

30-gauge needle

Linear vs. Bi-directional rotation Insertion

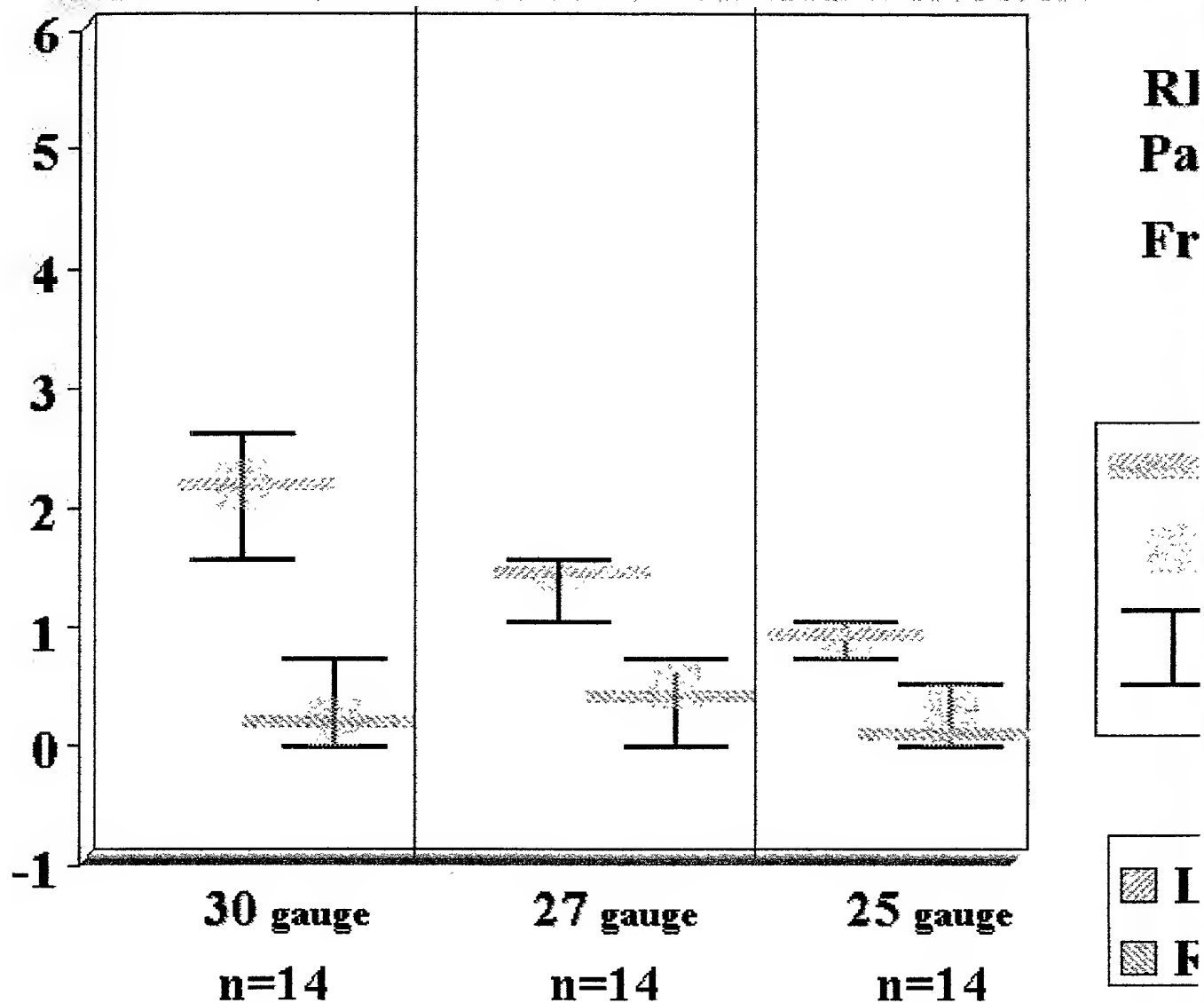


FIG. 4